GEOTEXTILE RETAINING WALLS
Effective: September 19, 2003
Revised: November 17,2003

Description. This work shall consist of furnishing the materials and the constructing of the geotextile retaining wall to the lines, grades and dimensions shown on the plans and as directed by the Engineer. The geotextile wall shall consist of successive layers of geotextile fabric anchored by placing select fill retained at the face by extending the fabric over a removable form brace and re-embedding the remaining fabric back into the select fill. The materials and construction methods shall comply with this Special Provision and the requirements specified by the geotextile supplier selected by the Contractor.

Submittals. The Contractor shall submit calculations demonstrating that the geotextile fabric they propose to use will provide an allowable tensile strength above the minimum value (T_{min}) specified in the contract plans. No work or ordering of materials for the geotextile wall shall be done until the submittal has been approved by the Engineer.

Materials. The Geotextile wall shall conform to the supplier's standards and the following:

(a) The geotextile shall satisfy the requirements of article 1080.05 and shall have both a minimum Ultraviolet (UV) Stability (percent strength retained following ASTM D 4355) of 70 percent as well as a minimum permeability of 0.1 cm/sec (0.2 ft/min). In addition to satisfying these properties, the allowable strength of the fabric shall meet or exceed the (T_{min}) strength specified on the plans. The geotextile allowable strength shall be determined according to the procedure covered in the Design Criteria Section of this specification.

The Contractor shall submit to the Engineer a manufacturer's certification which shall include the manufacturer's name, address, the geotextile product name, polymer type, and the products physical properties. The physical properties submitted shall include weight, grab strength, grab elongation, equivalent opening size, UV stability, permeability, and the allowable strength. The Contractor may be requested by the Engineer to submit a sample of the geotextile for testing by the department.

During shipment and storage, the geotextile shall be kept dry and wrapped in UV resistant material capable of protected it from damage from sunlight and other elements.

(b) The select fill, defined as the material placed in the geotextile reinforced volume, shall be according to the following:

(1) Select Fill Gradation. Either a coarse aggregate or a fine aggregate may be used. For coarse aggregate, gradations CA 6 thru CA 16 may be used. For fine aggregate, gradations FA 1, FA 2, or FA 20 may be used. Other aggregate gradations may be used provided the maximum aggregate size is 15 mm (3/4 in.), the maximum material passing the 425 μm (#40) sieve is 60 percent, and the maximum material passing the 75 μm (#200) sieve is 15 percent.

(2) Select Fill Quality. The coarse or fine aggregate shall be Class D quality or better.

(3) Select Fill Internal Friction Angle. The effective internal friction angle for the coarse or fine aggregate shall be a minimum 34 degrees according to AASHTO T 236 on samples compacted to 95 percent density according to AASHTO T 99.

(c) The embankment material behind the select fill shall be according to Section 202 and/or Section 204.

Design Criteria. The Contractor is responsible for selecting a geotextile fabric which will provide an allowable tensile strength larger than the minimum value (T_{min}) specified on the plans. The $T_{min.}$ required has been calculated using an internal stability analysis considering retained earth pressures, sloping backfill loadings, and typical surcharges from traffic or moderate construction equipment. The Contractor shall consider the project specific strength reduction due to long-term creep, chemical and biological degradation, as well as installation damage in their calculations to determine the allowable tensile strength of the geotextile selected for use. The determination of the allowable tensile strength of the fabric shall follow the AASHTO Design Specifications for Mechanically Stabilized Earth Wall Design, Allowable Stresses using geosynthetic reinforcement. The design life for this wall shall be 3 years unless otherwise indicated on the plans.

Construction. Prior to wall construction, the foundation soils supporting the wall shall be graded to a level uniform condition and compacted such that it is free from ruts and protruding objects such as rocks or sticks for a width equal to the length of the geotextile reinforcement. Any foundation soils found to be unsuitable shall be removed and replaced, as directed by the Engineer, and shall be paid for separately according to Section 202.

Wall construction shall begin at the lowest level of the wall and each layer shall be placed horizontally as shown in the construction sequence on the plans. The geotextile shall be stretched out in the direction perpendicular to the wall face to ensure that no slack or wrinkles exist in the geotextile prior to select fill placement. The select fill shall be placed or pushed onto the geotextile in a manor that does not distort or distress the fabric. The select fill shall not be dropped onto the fabric from a distance of more than 1.5 m (4.75 ft) and end dumping select fill from trucks directly onto the fabric shall not be permitted. A minimum of 100 mm (4 in.) of select fill material must be present between the geotextile and any equipment tires or tracks and sudden turning of equipment on the select fill shall be not be permitted to prevent construction damage or distortion to the fabric. Any damage to the fabric shall be repaired by the Contractor and required by the Engineer at no at no additional cost to the Department.

As select fill material is placed against the form brace, the form brace shall be maintained in position to produce proper fabric face alignment after the form brace is removed. The removable form brace detail shown in the plans is provided as a guide and the Contractor is responsible any modifications to the form brace required support the fabric face.

Select fill shall be compacted in 150 mm (6 in.) maximum lifts and the minimum required compaction shall be 95 percent of maximum density as determined by AASHTO T99. Sheepsfoot rollers or other rollers with protrusions shall not be used. Compaction in a strip 1 m (3 ft) wide adjacent to the backside of the panels shall be achieved using a minimum of 3

passes of a light weight mechanical tamper, roller or vibratory system. The embankment placement shall closely follow the erection of each lift of geotextile and select fill. The select fill material should be roughly leveled and compacted prior to placing the next level of geotextile. At the end of each day's operations, the Contractor shall shape the last level of select fill to permit runoff of rainwater away from the wall face.

Where geotextile fabric splices perpendicular to the wall face are required to connect separate pieces of geotextile, the fabric may be overlapped by at least 1.100 m (4 ft). No splices are allowed parallel to the wall face as the geotextile must extend continuously from the rear limits of the soil reinforcement, around the face and terminate at the end of the re-embedment length.

At locations where the plans specify a change of wall alignment, the fabric shall be neatly folded over itself to create inside turns or it may be cut perpendicular to the wall face and lapped at the wall face for outside wall turns to ensure no loss of select fill. Fabric layers shown terminating against a cut slope, sheet piling, concrete walls or other structures must have at least 1 meter (3 ft) of additional fabric extending past or placed against the surface, neatly folded back in such a manor to ensure adequate embedment and no lose of select fill.

The elevation of each geotextile reinforcement layer shall placed within 75 mm (3 in.) from that shown on the plans. The offset of the wall face bulge shall be within 125 mm (5 in.) of that shown on the plans at each layer, and along the entire length of wall. Failure to meet this tolerance may cause the Engineer to require the Contractor to disassemble and re-erect the affected portions of the wall.

Method of Measurement. Geotextile Retaining Wall will be measured for payment in square meters (square feet) of completed wall face. The area will be calculated from the top limits of the geotextile to the bottom level of fabric reinforcement at each variation along the length of the wall.

Basis of Payment. This work, including placement of the geotextile, temporary support of the face, placement of the select fill within the geotextile reinforced wall volume shown on the plans will be paid for at the contract unit price per square meter (square foot) for GEOTEXTILE RETAINING WALL.

Embankment placed outside of the select fill volume will be measured and paid for according to Sections 202 and/or 204 as applicable.